

What's claimed ~~claims~~

1. Process for producing a substrate with at least one layer (5) of aluminum nitride ceramic, in which (process) one auxiliary or intermediate layer (6, 6a, 6b) of aluminum oxide is applied to at least one side of this layer (5), characterized in that intermediate layer (6, 6a, 6b) is applied using a copper oxide-containing material such that the intermediate layer at least in part of its thickness contains a portion of copper oxide of roughly 0.05-44 percent by weight, and that layer (5) of aluminum nitride first on at least one surface side is provided with a roughly 1.5×10^{-4} to 1200×10^{-4} micron thick layer of copper or copper oxide or other copper-containing compounds and then at a temperature between roughly 800 - 1300°C is treated in an oxygen-containing atmosphere until an intermediate layer with the desired thickness has formed.

2. Process according to claim 1, wherein treatment in the oxygen-containing atmosphere lasts until a layer thickness of roughly 0.5 - 10 microns has developed for respective intermediate layer (6, 6a, 6b).

3. Process according to claim 1, wherein aluminum nitride is treated in an oxygen-containing atmosphere, at the same time copper-oxide containing material is reacted via the gaseous phase with the forming aluminum oxide (Al_2O_3).

4. Process according to claim 3, wherein treatment in the oxygen-containing atmosphere with a portion of vaporous copper oxide lasts until a layer thickness of roughly 0.5 - 10 microns has developed.

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5. Process according to one of claims 1, wherein after producing at least one intermediate layer (6, 6a, 6b) metal layer (8) is attached to the latter over its surface using a oxidized metal or copper foil and using the DCB process.

6. Process according to one of claims 1, wherein at least one layer (5) of aluminum oxide ceramic is provided on both sides with one intermediate layer (6, 6a, 6b) each, and wherein one metal or copper layer is applied to each of the two intermediate layers using the DCB process.

7. Substrate with at least one layer (5) essentially of aluminum nitride (AlN) which is provided on at least one surface side with intermediate or auxiliary layer (6, 6a, 6b) which contains aluminum oxide (Al_2O_3) and which has a thickness in the range of roughly 0.5 - 10 microns, wherein intermediate layer (6, 6a, 6b) as the additive contains 0.05-44 percent by weight of at least one copper oxide, and wherein the proportion of copper oxide in the intermediate layer is provided uniformly distributed in clusters.

8. Substrate according to claim 7, wherein the clusters have a diameter of less than roughly 0.01 microns.

9. Substrate according to claim 7, wherein the copper oxide in area (6) of intermediate layer (6a) adjacent to layer (5) of aluminum oxide is enriched.

10. Substrate according to claim 7, wherein intermediate layer (6a) consists of a first layer of aluminum oxide which is directly adjacent to the layer of aluminum nitride and which contains a portion of copper oxide, and of adjacent second

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aluminum oxide layer (7') which contains no copper or copper oxide or essentially none.

11. Substrate according to claim 7, wherein the concentration of copper oxide in intermediate layer (6a) decreases with increasing distance from layer (5) of aluminum nitride.

12. Substrate according to claim 7, wherein the portion of copper oxide is present in the aluminum oxide as copper-aluminum-spinel (CuAl_2O_4 or CuAlO).

13. Substrate according to claim 7, wherein layer (5) of aluminum nitride is joined flat on one side via intermediate layer (6, 6a, 6b) there with a copper layer or metal coating (8), preferably with a 0.1 - 0.8 mm thick copper layer.

14. Substrate according to claim 7, wherein copper layer (8) is joined via oxygen rich copper phase (9), preferably via an oxygen-rich copper phase with a thickness of at least three microns, to one side of layer (5) of aluminum nitride or to intermediate layer (6, 6a, 6b) there.

15. Substrate according to claim 7, wherein at least one layer (5) of aluminum nitride contains roughly 0.5 - 6 percent by weight CaO or another binder.

16. Substrate according to claim 7, wherein a portion of the binder is likewise present in the intermediate layer.

17. Substrate according to claim 7, wherein at least one copper layer (8) is applied to at least one side of at least one layer (5) of aluminum nitride or to intermediate layer (6, 6a, 6b) there in the DCB process.

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